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NORTON SOUND DISTRICT
SALMON REPORT
to the
Alaska Board of Fisheries

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Introduction

The Norton Sound Salmon District consists of all waters between Cape Douglas in the north and Canal Point Light in the south. The District is divided into six subdistricts: Subdistrict 1, Nome; Subdistrict 2, Golovin; Subdistrict 3, Moses Point; Subdistrict 4, Norton Bay; Subdistrict 5, Shaktoolik; and Subdistrict 6, Unalakleet Subdistrict. Each of these subdistricts contain at least one major salmon producing stream and the boundaries were established to facilitate management of individual salmon stocks.

All commercial salmon fishing in the district is by set gillnets in marine waters and fishing effort is usually concentrated near river mouths. Commercial fishing typically begins in June and targets chinook salmon. Emphasis switches to chum salmon around June 25 and the coho fishery begins the third week of July. The season closes September 7. Pink salmon may be very abundant on even year returns and a pink directed fishery may replace or may be arranged with alternating periods with the historical chum directed fishery.

Salmon management has changed significantly during recent years due to limited market conditions and marginal returns of many salmon stocks within the district. The Eastern subdistricts, Norton Bay, Shaktoolik, and Unalakleet all have fairly healthy salmon stocks. Commercial fishing in these subdistricts is managed using commercial fishing statistics and the Unalakleet River test fishing escapement index. Both the Golovin and Moses Point Subdistricts have recently suffered from poor chum salmon returns. In these two subdistricts, management first insures an adequate escapement, then a subsistence harvest within historical levels and finally an attempt is made to provide for a commercial and sport harvest. The Nome Subdistrict is managed intensively for subsistence use. Registration permits, closed waters, setting fishing period length, limiting gear and harvest limits are all tools that can be employed throughout the season to provide for escapement needs and to maximize subsistence opportunity.

Commercial Fishery Overview

The 1995 Norton Sound District commercial salmon fishing season was first opened by emergency order in the Unalakleet and Shaktoolik Subdistricts on June 12 and ended by regulation on August 25. The commercial salmon harvest totaled 181,392 fish which was comprised of 8,860 chinook, 128 sockeye, 47,862 coho, 81,644 pink, and 42,898 chum salmon (Table 1). Approximately 105 permit holders participated in the fishery and received $356,912 for their catch (Table 2 and 3).

Table 1 lists the Norton Sound historical salmon and the current year commercial harvests relative to the previous 5 year (1990-1994) and the previous 10 year (1985-1994) averages. The chinook

salmon harvest was 31% above the previous 5 year average and 15% above the previous 10 year average. The coho salmon harvest was 36% below the previous 5 year average and 10% below the previous 10 year average catches. Historically Norton Sound has had very limited, but sporadic markets for pink salmon. Because a new market opened in 1994, the 1995 pink salmon harvest was expected to total approximately one half million fish. The 1995 return was weak and resulted in a pink salmon harvest that was less than 20 percent of expectations. The chum salmon commercial harvest was 30% below the 5 year average and 49% below the 10 year average catches for Norton Sound.

A total of 172 CFEC permits were renewed, of which 105 actually fished during the 1995 season which is the new record low (Table 2). The number of participating fishermen this season was 24% below the previous 10 year average of 138. Low effort levels typically occur when there is a drop in salmon returns or when prices are low. The northern subdistricts had historically landed approximately 50% of the total commercial chum salmon harvest, but did not participate during that portion of the season due to chum restrictions. In addition, participation in the pink salmon fishery was minimal due to the low pink returns.

Two primary salmon buyers operated in Norton Sound during the 1995 season. One buyer purchased fish during the chinook and coho salmon seasons while the other buyer was interested in pink salmon. The chinook and coho salmon were delivered at Unalakleet and Nome using tenders and aircraft. The fish were headed and gutted then shipped airfreight to markets. The other buyer , which purchased pink salmon, tendered fish throughout Norton Sound to their processing vessel located along the eastern coast. The floating processor custom processed the pink salmon using pollock filet machines and packaging then held the product onboard. Some of the product from the chinook and coho salmon purchased by the shore based company was also held on the freezer vessel. In addition, a few individual fishermen sold their catch of fresh salmon locally and to wholesale distributors, as permitted under catcher-seller status. The average price paid for chinook was $.66 per pound, $.50/lb. for sockeye, $.43/lb. for coho, $.18/lb. for pink, and $.18/lb. for chum salmon. The total value of the raw fish, $356,912, was 30% below the previous 5 year (1990-1994) average (Table 3).

The 1995 Salmon Management Plan for Norton Sound dictated that the chum salmon harvest was to be held to one-half the historical levels due to conservation concerns. Consequently, chinook salmon were targeted early in the season using minimum mesh size restrictions which were intended to minimize chum catches. As the season progressed, chinook salmon returns were above average and early indications were that good numbers of chum salmon were escaping into most Norton Sound rivers. The salmon chum market was very limited. Fish buyers were prepared to purchase some chum salmon, but had to chose between buying early, good quality chum and buying a later, lesser quality chum caught incidentally in the later pink and coho salmon fisheries; thereby, maximizing the pink and coho harvests. Mesh restrictions were briefly relaxed to allow for some chum salmon harvest in the southern subdistricts before the market switched to pink salmon. Maximum mesh size restrictions and special harvest areas were used to target the pink salmon which returned much weaker than expected. Commercial fishing was closed for

several periods between the end of the pink salmon fishery and prior to the coho salmon fishery. Chum salmon were still running, but their quality was declining. Commercial fishing resumed once the coho salmon return began to build and coho salmon predominated in the commercial catch. At that point, the chum salmon escapements were known to have been met and the fish buyers had relatively few water marked chum salmon to accept. The commercial salmon season closed early as it became apparent that the coho salmon return was below average. A reduction in commercial harvest was necessary to attain desired coho escapement levels.

Subsistence Fishery Overview

Household subsistence surveys will be partially funded by the Commercial Fisheries Management and Development Division and implemented by the Division of Subsistence during the Fall of 1995 in Norton Sound villages. This information will be available in later reports. Daily interviews of Unalakleet River and ocean subsistence fishermen were conducted at Unalakleet during the early portion of the fishing season in order to monitor the chinook salmon return. Total harvests by subsistence fishermen were not documented, however effort and catch information was used, in combination with the Department's test net in the lower Unalakleet River and commercial catch information, to judge the timing and magnitude of the chinook salmon return. This information was the basis for scheduling early commercial salmon fishing periods in the Unalakleet and Shaktoolik Subdistricts. Commercial fishing is typically only allowed after chinook salmon have been observed entering the Unalakleet River in increasing numbers for a week's time to assure the harvest is directed on a actively migrating local stock and not on milling fish.

Subsistence fishing permits are required by regulation for each household that fishes in the Nome Subdistrict. These permits identify the body of water to be fished, the type of gear used, and the bag limit which is specific to that body of water. In addition the permit contains a catch calendar where the permit holder records catches in numbers of each species of fish for each day fished. If the subsistence fishers have filled their bag limits or would like to fish another location, they can be issued another permit generally for another area after the previous one has been returned. These permits are important to management because they identify users and bag limits, but the actual catch information can not be compiled until well after the season when the permits are returned to the Department of Fish and Game. This information will also be presented in a later report.

SEASON SUMMARY BY SUBDISTRICT

Nome - Subdistrict 1

The commercial salmon season in the Nome Subdistrict was opened by Emergency Order (E.O.) on August 3. This management action which delayed the season was taken in order to avoid the

harvest of chum and pink salmon that were expected to return in low numbers to the subdistrict. Sport fishing for chum salmon is closed by regulation in the subdistrict and subsistence fishing was closed prior to the beginning of the chum salmon return for nearly the entire area except in marine waters East of Cape Nome which actually had increased fishing time over recent years. Subsistence fishing restrictions were incrementally relaxed on a stream-by-stream basis as chum salmon escapements appeared certain to be met. Chum salmon returns to the streams east of Cape Nome were strong, while the pink salmon returns were much lower than expected, for an odd year return which are significantly smaller than even year returns. On July 17, an Emergency Order was announced that allowed the use of beach seines with the condition that all pink salmon had to be released. This enabled fishermen to take advantage of the more abundant chum salmon in several streams while protecting the weaker pink salmon return.

As stated above, the Nome Subdistrict opened for a directed commercial fishery on coho salmon beginning August 3. Only two fishermen reported sales. The reason for the low effort was due to typical poor weather conditions during August and low salmon abundance. Like other Norton Sound streams, rivers in the Nome Subdistrict experienced poor coho salmon returns. An Emergency Order issued on August 24, closed commercial fishing in the subdistrict. Additionally, sport fishing for coho salmon and subsistence fishing were closed on August 25 in the Nome area to help bolster coho salmon escapements. Subsistence fishing reopened on September 16. The total commercial harvest for the subdistrict included 1 sockeye, 369 coho, and 122 chum salmon (Table 2 and 5). One hundred nineteen subsistence permits were issued for the Nome area.

Golovin - Subdistrict 2

Over the last six years, chum salmon stocks in the Golovin Subdistrict have received little or no commercial exploitation and still have not made spawning escapements in some years. The 1995 Salmon Management Plan informed fishermen that the Golovin Subdistrict commercial harvest would be limited to a maximum of 10,000 chum salmon before July 10 in an attempt to insure an adequate chum salmon escapement. By that date, the chum salmon run would be assessed and fishing time would be adjusted accordingly. The planned pink and coho salmon fisheries were expected to have an incidental chum salmon harvest, therefore the salmon buyer and the salmon fishermen decided not to jeopardize the pink and coho salmon fisheries with an early harvest of chum salmon. Both the pink and coho salmon fishery were thought to be potentially more lucrative than the chum salmon fishery.

An Emergency Order issued July 17 opened the Golovin Bay Subdistrict to a schedule of three 24 hour periods per week and limited mesh size to pink gear only. The subdistrict was closed to commercial fishing on July 24 at the request of the salmon buyer. Commercial fishing reopened on July 31 to a three 24 hour period per week schedule with a maximum mesh size restriction of six inches to target coho salmon. Fishing schedules were changed on two occasions to accommodate tender logistics. Fishing time also increased slightly to two 48 hour periods per week since effort had dropped off.

Commercial fishing was closed on August 26 when it was apparent that coho salmon escapements would be low. Seven fishermen made deliveries for a total commercial harvest of 1,616 coho, 4,296 pink and 1,987 chum salmon (Table 2 and 6). The pink salmon were tendered to a floating processor near Shaktoolik and the coho salmon were flown to Nome by small aircraft for processing.

Moses Point - Subdistrict 3

The Moses Point Subdistrict chum salmon return has also experienced a decrease in size in recent years despite conservative management actions. The salmon management plan stated that there was to be no chum salmon directed commercial fishery with the possibility of a subsistence closure during the run if the chum escapement levels appeared certain to fall short of the Kwiniuk River counting tower goal of 19,500 chum salmon. Commercial fishing was to remain closed through June and July to protect the chum salmon stocks with the exception of a possible pink salmon directed fishery. If chum salmon levels were low, attempts would be made to minimize the impact on the subsistence harvest by allowing directed fishing on other salmon species. The return was closely monitored throughout the run at the Kwiniuk River counting tower.

The chum salmon return arrived early and strong, but as a result of conservative management and lack of market, no directed fishery occurred. The preseason management plan prescribed a limited pink salmon directed fishery in the subdistrict. The pink salmon return was expected to be low, but the plan was to allow a limited harvest from each subdistrict thereby keeping the interest of the fledgling pink salmon market while minimizing the impact to a weak return. However, when the pink salmon run returned weaker than expected, some fishers became concerned for their subsistence fishery. A village meeting was held at Elim and was attended by the Department of Fish and Game, the salmon buyer, and both commercial and subsistence fishermen. An agreement was reached and a pink salmon directed commercial fishery was opened July 17 on a weekly schedule of three 24 hour periods per week with boundary restrictions that moved commercial fishing away from the subsistence use area and to maintain product quality.

Fishing was also closed in the Moses Point Subdistrict on July 24 because of low pink salmon returns and then reopened on July 31 to target coho salmon. The subdistrict made fishing schedule changes similar to the Golovin Subdistrict, two schedule changes and one fishing time increase as a result of low effort and a seemingly adequate coho salmon escapement. However, the subdistrict was closed August 26 when it became obvious that the coho return was below average.

The Moses Point total harvest taken by 12 fishermen included 4 chinook, 44 sockeye, 3,742 coho 2,962 pink, and 1,171 chum salmon (Table 2 and 7). The coho catch was 32% below the previous 5 year average (1990-1994) and 30% below the previous 10 year average (1985-1994). The chum salmon harvest was low at 15% above and 86% below the previous 5 and 10 year

averages. The last significant chum salmon harvest in the Moses Point Subdistrict was taken in 1988.

Norton Bay - Subdistrict 4

The Norton Bay Subdistrict has always had difficulty attracting a buyer due to its remoteness and its reputation for water-marked fish. Consequently, a regulatory change became effective in 1995 that moved the western boundary from Six Mile Point to Isaac's Point which was intended to improve fish quality. Partially as a result of minimal fishing in recent years and alternative employment in construction, there was little interest in commercial fishing and no buyers operated in the subdistrict in 1995. Due to lack of timely salmon escapement information the Norton Bay Subdistrict is managed similar to the Shaktoolik and Unalakleet Subdistricts because they reflect similar trends in salmon return strength and timing.

The subdistrict opened on June 12 to target chinook salmon using a 7.5 inch minimum mesh restriction for one 24 hour period even though there was no buyer in order to provide an opportunity for fishermen to locate a market. On June 15, fishing time was set on a standard schedule of two 24 hour periods per week with chinook gear only and was increased to two 48 hour periods per week on June 20 because the chinook return appeared strong. The fishery was expanded to unrestricted mesh size on June 29 to open up the potential harvest since no commercial landings had been made in the subdistrict. On August 19, the subdistrict was closed for the season to maintain an orderly fishery. All other subdistricts in Norton Sound were closed, the coho salmon run was well past it's peak, and nobody expressed an interest in fishing in the subdistrict. This was the fifth time in the last ten years that no landings had been made in the Norton Bay Subdistrict and the last significant harvest was taken in 1988.

Shaktoolik and Unalakleet - Subdistricts 5 and 6

Both the Shaktoolik Subdistrict and the Unalakleet Subdistrict, which share a common boundary, consistently attract commercial markets due to greater fish abundance and better transportation services. Management actions typically encompass both subdistricts because salmon tend to intermingle and harvest in one subdistrict, affects the movement of fish in the adjacent subdistrict. As stated earlier the department's test net in the Unalakleet River and subsistence interviews at Unalakleet are used to set early fishing periods in both subdistricts. As the season progresses, the test net and commercial catch indices are used to assess return strengths of each salmon species. Aerial surveys are frequently not obtained in either subdistrict due to poor survey conditions and are used as a late assessment check because of the long travel time between the fishery and the spawning grounds (Table 4).

The first fishing period in both subdistricts opened on June 12 and ran 24 hours. It was directed at chinook salmon using a minimum mesh size restriction of 7.5 inches. On June 15, both

subdistricts went to a standard schedule of two 24 hour periods per week. Fishing time was increased to two 48 hour periods per week on June 20 because the chinook salmon return continued to look strong, the chum salmon return was building, and the pink salmon return was expected to be low, but it was still too early to assess. On June 29, unrestricted fishing gear mesh size was allowed as the chum and pink salmon migration was advancing. A buyer was willing to purchase chum and pink salmon. Gear restrictions were rescinded as they were no longer necessary for conservation or to direct fishermen to a particular species. Fishermen shifted from chinook to chum salmon gear.

On July 10, the fishery began targeting pink salmon. The chum salmon market had declined and the fish processor was interested in pink salmon even though the pink salmon return was expected to be weak. The management plan stated the department's intent to distribute the pink salmon fishery over subdistricts 2, 3, 4, 5, and 6 in an effort to avoid over harvest in any one particular watershed. Fishing time changed to three periods per week, two 24 hour periods and one 36 hour period, and gear was restricted to a 4.5 inch maximum mesh size. These actions allowed the processor time to move his tender throughout Norton Sound and to limit the take of the less desired chum salmon. Both the Shaktoolik and Unalakleet Subdistricts were closed on July 17 to commercial fishing. The pink salmon return was continuing to build, but escapements were minimal. By closing prior to the peak, the pink salmon return entering the rivers could still provide for adequate subsistence harvests and escapements.

Both subdistricts reopened on July 24 for a single 48 hour period with gear restricted to a maximum mesh size of 6 inches in order to provide an early assessment of the building coho salmon migration. The coho catch was low and the chum catch was high. Fishing remained closed until July 31 when it was opened to the standard schedule of two 48 hour periods per week. Fishing schedules were changed twice to allow the tender to adjust to time changes in other subdistricts. The coho salmon migration continued to build, but commercial catches and escapement indices were below normal. Both the Shaktoolik and Unalakleet Subdistricts closed for the season on August 26. Early in the coho salmon run, fisheries management was optimistic since predictions were for a strong return. However, there was no late pulse of fish as evidenced by the department's test net and aerial surveys. The late season closure was intended to bolster escapement by allowing the remainder of the coho salmon migration to enter freshwater.

Commercial catches in the Shaktoolik Subdistrict included 1,239 chinook, 5 sockeye, 10,855 coho, 37,377 pink, and 14,775 chum salmon (Table 2 and 8). The chinook salmon harvest was 29% below the previous 5 year average and 36% below the previous 10 year average. The coho salmon harvest was 15% below the previous 5 year average and 14% above previous 10 year average. The pink salmon harvest varies widely from year to year due to markets and the cyclic nature of the species. The 1995 harvest of pink salmon was 69% below the 5 year average and 39% below the 10 year average. Chum salmon were targeted for only three periods and were incidentally caught during other directed fisheries. The total chum salmon harvest was 31% below the 5 year average and 23% below the 10 year average harvest.

The Unalakleet Subdistrict had similar catches and trends. The harvest included 7,617 chinook, 78 sockeye, 31,280 coho, 37,009 pink, and 24,843 chum salmon (Table 2 and 9). The chinook salmon catch was 57% above the previous 5 year average and 33% above the previous 10 year average. Again, the coho salmon harvest in the subdistrict was 45% and 21% below the previous 5 and 10 year averages. The pink salmon harvest was also low at 65% below the 5 year average and 33% below the 10 year average. The total chum salmon harvest in the Unalakleet Subdistrict was low at 21% below the previous 5 year average and 10% below the previous 10 year average.

ESCAPEMENT

Table 4 lists aerial survey and tower escapement counts in the major index streams of Norton Sound. Survey conditions were fair to good throughout the entire district in 1995 which allowed peak aerial surveys for most streams for each species. The Nome Subdistrict streams received the most intensive survey efforts because salmon stocks local to the Nome area are limited, easily accessed by road system, and can be exposed to subsistence and sport fishing pressure.

Department escapement projects in the Norton Sound District include counting towers on the Kwiniuk, Nome, and Niukluk Rivers and a test net at Unalakleet River. Both the Unalakleet test net and the Kwiniuk tower projects have been in operation for many years. They provide comparable and timely information which is used as a basis for inseason salmon management decisions. The Nome River tower first began in late 1993 and was operational throughout 1995 while the Niukluk tower became functional in 1995. Both projects have limited historic data that can be used when making comparisons, but will become more valuable the longer they operate.

Two additional counting tower projects were also operated in the Nome area this season. The Snake River project was setup and operated by Kawarak Corporation who received BIA pass-through money to run the project. The other counting tower was located on the Eldorado River and was funded by the Sitnasuak Corporation. Both projects ran as cooperative ventures with the Department of Fish and Game who supplied technical support. The projects supplied daily information to the department that was very useful to management of local salmon resources.

Chinook Salmon

The Unalakleet and Shaktoolik Subdistricts are the primary chinook salmon producers in Norton Sound. Although on a smaller scale, the Norton Bay, Moses Point and Golovin Subdistricts have experienced a gradually increasing trend of chinook returns in recent years. Daily subsistence fishermen interviews conducted at Unalakleet, the Department's test fish project in the Unalakleet River, aerial escapement surveys, and comparative commercial catch data all indicated that chinook salmon escapements were slightly above average in the Unalakleet Subdistricts and slightly below average in the Shaktoolik Subdistrict. The Kwiniuk River counting tower had a slightly higher than average chinook salmon passage.

Chum Salmon

As stated earlier, chum salmon escapements were typically above average throughout Norton Sound in 1995. Streams in the Nome Subdistrict were surveyed with mixed results, while the counting towers indicated strong runs particularly in the Eldorado and Flambeau Rivers. Tower passage goals have not been developed for these systems. Comparative run strength of the chum salmon returns primarily from aerial survey comparisons indicate that the Snake and Nome Rivers were close to their escapement goals while the Eldorado and Flambeau Rivers exceeded their goals by nearly 100%. The Sinuk River chum salmon escapement was found to be roughly 70% of the goal and the Solomon River chum salmon escapement was less than 60% of the goal.

The Golovin Bay Subdistrict is primarily a one river system with escapement goals set for individual tributaries. Aerial surveys this season put the chum salmon escapement at 54% above the escapement goal for the combined system. Again, the Niukluk River counting tower does not have a comparative data base, but did document a substantial number of chum salmon past the tower which tends to confirm that chum salmon escapement to the subdistrict was good.

The Moses Point Subdistrict had good chum escapements as documented by the Kwiniuk River counting tower which had an expanded count of 42,161 chum salmon pass the tower. This was 116% above the tower passage goal of 19,500 chum salmon and was the highest escapement since 1984. The Tubutulik River which is also a major stream in the Moses Point Subdistrict, had an aerial count that was also the highest since 1984. Only one stream in the Norton Bay Subdistrict was surveyed and exceeded its goal by 5 times; this was a new record. The subdistrict was assumed to have had good chum salmon escapements. Aerial surveys in the Unalakleet and Shaktoolik Subdistricts are not consistently obtained each year, but counts in 1995 were in the average range while the test net in the Unalakleet River had the highest chum salmon total since 1981. Therefore it is believed that both subdistricts had adequate chum salmon escapements.

Coho Salmon

Coho salmon are found in nearly all of the chum salmon producing streams throughout Norton Sound with the primary commercial contributors being the Unalakleet and Shaktoolik Rivers. Because inclement weather is normally experienced in this area during August and September, escapement data for all subdistricts can be somewhat sketchy. Streams in the northern subdistricts of Norton Sound are consistently surveyed. The Unalakleet River test net has the best data set to compare coho salmon escapement in eastern Norton Sound. Counting towers in the northern subdistricts generally do not operate during the coho salmon migration due to budget restrictions. In 1995, both the Nome and Niukluk River counting towers were operational through the coho run.

Overall, coho salmon escapements appeared to be average to below average. The Nome Subdistrict coho escapements were below average. The Golovin Bay, Moses Point, Shaktoolik,

and Unalakleet Subdistrict all had average coho salmon escapements. The Norton Bay Subdistrict was not surveyed, but since no commercial fishery occurred with only limited subsistence harvest, it is assumed that escapement was adequate.

Pink Salmon

During recent years, pink salmon returns to Norton Sound have followed an odd/even year cycle with the even years typically much larger than the odd years. The 1995 pink salmon return was considerably less than expected for a low year return throughout Norton Sound. Aerial survey data obtained for most index streams, was supplemented with tower counts, commercial catch data, Unalakleet test net data, and anecdotal data suggested that the low pink salmon return was widespread and below expectations.

MANAGEMENT CONCERNS

Chum salmon stocks have declined throughout Norton Sound over the past six or seven years with escapements in the northern subdistricts continuing to be a major concern. Chum salmon escapements have consistently fallen short of goals even at times when all forms of harvest have been drastically reduced or eliminated. The Nome Subdistrict was closed in 1995 during nearly the entire chum salmon run to sport and commercial fishing. Subsistence fishing management actions included requiring intense management on a stream-by-stream basis. The Golovin and Moses Point Subdistricts both exceeded their escapement goals and could have supported harvests approaching typical commercial levels of 20,000 to 40,000 each. Likewise, both the Shaktoolik and Unalakleet Subdistricts had below average commercial catches with adequate escapements. The 1995 chum salmon returns were better than expected, but less than the average historical returns. Escapement goals were obtained for most index streams, but chum harvest will continue to be managed conservatively as returns can be expected to be low for the next several years since the returns will be coming from low parent years.

The renewed interest in Norton Sound pink salmon commercial fishing has proven feasible and manageable on strong year classes, but is questionable during weak return years. Management Plans will have to be developed that set exploitation levels and escapement needs, gear and harvest requirements, and consider incidental weak stock impacts.

Salmon marketing conditions has become a significant factor for consideration when scheduling fishing periods. Market conditions have caused more restrictive limitations than biological factors in recent years for many species. Purchasers frequently notify the Department of Fish and Game that they can only handle a limited quantity with a high quality standard and at a specific rate to optimize their operations. The manager must not only monitor the salmon returns and harvest rates, but must coordinate schedules with the salmon buyers to maintain the limited markets available for Norton Sound salmon.

1996 Outlook

Salmon forecasts and harvest projections for the 1996 commercial salmon season are based on qualitative assessments of brood year returns, subjective determinations of freshwater over-wintering and ocean survival, and projections of local market conditions. Salmon buyers probably will not operate in all of the Norton Sound subdistricts during 1996. The chinook return is expected to be average with a commercial harvest ranging from 5,000 to 8,000 fish. The often uncertain pink salmon market is expected to be present in 1996. However, the record parent year class which returned to spawn in 1994 was followed by a catastrophic flood event that likely reduced egg survival. Consequently, the pink salmon return for 1996 will be unpredictable with a potential harvest that could vary widely from 100,000 to 1 million fish. The 1996 chum salmon return is expected to be about average while the market for Norton Sound chum will likely be weak. The commercial harvest of chum salmon will be managed conservatively with an expected total catch between 40,000 and 80,000. The 1992 coho salmon commercial harvest and escapements indicate that the 1996 coho return well be above average and the commercial harvest is expected to range from 50,000 to 80,000 fish.

Table 1. Commercial salmon catches by species, Norton Sound District, 1961-1995.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1961	5,300	35	13,807	34,327	48,332	101,801
1962	7,286	18	9,156	33,187	182,784	232,431
1963	6,613	71	16,765	55,625	154,789	233,863
1964	2,018	126	98	13,567	148,862	164,671
1965	1,449	30	2,030	220	36,795	40,524
1966	1,553	14	5,755	12,778	80,245	100,345
1967	1,804	-	2,379	28,879	41,756	74,818
1968	1,045	-	6,885	71,179	45,300	124,499
1969	2,392	-	6,836	86,949	82,795	178,972
1970	1,853	-	4,423	64,908	107,034	178,218
1971	2,593	-	3,127	4,895	131,362	141,977
1972	2,938	-	454	45,182	100,920	149,494
1973	1,918	-	9,282	46,499	119,098	176,797
1974	2,951	-	2,092	148,519	162,267	315,829
1975	2,393	2	4,593	32,388	212,485	251,861
1976	2,243	11	6,934	87,916	95,956	193,060
1977	4,500	5	3,690	48,675	200,455	257,325
1978	9,819	12	7,335	325,503	189,279	531,948
1979	10,706	57	31,438	167,411	140,789	350,344
1980	6,311	40	29,842	227,352	180,792	444,337
1981	7,929	56	31,562	232,479	169,708	441,734
1982	5,892	10	91,690	230,281	183,335	511,208
1983	10,308	27	49,735	76,913	319,437	456,420
1984	8,455	6	67,875	119,381	146,442	342,159
1985	19,491	166	21,968	3,647	134,928	180,200
1986	6,395	233	35,600	41,260	146,912	230,400
1987	7,080	207	24,279	2,260	102,457	136,283
1988	4,096	1,252	37,247	74,604	107,967	225,166
1989	5,707	265	44,091	123	42,625	92,811
1990	8,895	434	56,712	501	65,123	131,665
1991	6,068	203	63,647	221	86,871	157,010
1992	4,541	296	105,418	6,284	83,394	199,933
1993	8,972	279	43,283	157,574	53,562	263,670
1994	5,285	80	102,140	982,389	18,290	1,108,184
1995	8,860	128	47,862	81,644	42,898	181,392
Previous 5-Yr Avg[a]	6,752	258	74,240	229,394	61,448	372,092
Previous 10-Yr Avg[b]	7,653	342	53,439	126,886	84,213	272,532

[a] 1990-1994
[b] 1985-1994

Table 2. Norton Sound commercial salmon harvest summary by subdistrict, 1995.

		Subdistricts 1	2	3	4	5	6	Total Number
Number of Fishermen		2	7	12	0	26	58	105 [a]
Chinook	Number	0	0	4	0	1,239	7,617	8,860
	Weight(lbs.)			51		26,021	148,699	174,771
Sockeye	Number	1	0	44	0	5	78	128
	Weight(lbs.)	7		316		33	564	920
Coho	Number	369	1,616	3,742	0	10,855	31,280	47,862
	Weight(lbs.)	2,695	11,317	27,001		83,628	231,549	356,190
Pink	Number	0	4,296	2,962	0	37,377	37,009	81,644
	Weight(lbs.)		10,096	7,429		93,194	87,402	198,121
Chum	Number	122	1,987	1,171	0	14,775	24,843	42,898
	Weight(lbs.)	791	13,310	7,409		99,140	169,795	290,445
Totals	Number	492	7,899	7,923	0	64,251	100,827	181,392
	Weight(lbs.)	3,493	34,723	42,206	0	302,016	638,009	1,020,447

[a] Some fishermen fished more than one subdistrict.

Table 3. Norton Sound salmon dollar value and average price paid to the fisherman, by species, 1995.

Species	Dolar value	Average price per pound
Chinook	$115,348.86	$0.66
Sockeye	$460.00	$0.50
Coho	$153,161.70	$0.43
Pink	$35,661.78	$0.18
Chum	$52,280.10	$0.18
Total Value	$356,912.44	

Table 4. Salmon survey counts of Norton Sound streams and associated chum salmon escapement goals, 1995.

Stream Name	Chinook	Coho	Sockeye	Pink	Chum	Chum Goal
Salmon L.			5,433			
Grand Central R.			628 [b]			
Pilgrim R.		586			1,410 [c]	
Glacial L.			733			
Sinuk R.		290 [b]		1,250	3,110	4,500
Cripple R.		100 [b]		150 [b]		
Penny R.					15 [b]	
Snake R.		132 [b]			14 [b]	1,000 [f]
Nome R.		517		182	1,855	2,000 [f]
Flambeau R.		68		350	6,455	3,250
Eldorado R.		247		50	9,025	5,250 [f]
Bonanza R.		510		619		1,500
Solomon R.		105		350	315	550
Fish R.	40	1,829		780	13,433	17,500
Boston Cr.	78	230			4,221	2,500
Niukluk R.	48	2,136		200	25,358	8,000 [f]
Ophir Cr.		15				
Kwiniuk R.	468 [d]	1,625		17,573 [d]	42,161 [d]	19,500 [e]
Tubutulik R.	377	930		4,020	16,518	12,000
Inglutalik R.						8,500
Ungalik R.	32			19,700	13,475	2,500
Shaktoolik R.	270	1,665		29680	9,060	11,000
Unalakeet R.	532	1,784 [a]		1,950	5,610	
North R.	622	690 [a]		18,300	1,370	2,000
Old Woman R.	424	818			470	100
Kogok R.	5	11 [a]		20 [a]	777 [a]	
Pikmiktalik R.	23	876 [a]		183	717	

Note: A multitude of factors affect escapement estimates. The numbers above are strict values that are instantaneous counts which may not truely represent the strength of the return. Refer to text for an evaluation of the return.

[a] Counts should be considered minimums due to counting conditions.
[b] Early count.
[c] Late count.Chum goal for tower count.
[d] Preliminay expanded tower counts.
[e] Chum goal for tower count.
[f] Chum goal for aerial survey.

Table 5. Commercial salmon set gillnet catches from Nome, Subdistrict 1, Norton Sound, 1995.

Period Number	Period Dates	Hours Fished	No. of Fishermen	Period Catch and Catch Per Unit Effort						Cumulative Catch and Catch Per Unit Effort					
				Chinook	Sockeye	Coho	CPUE	Chum	CPUE	Chinook	Sockeye	Coho	CPUE	Chum	CPUE
1 Coho	8/03-8/04	24	0	No deliveries											
2 Coho	8/07-8/08	24	1	0	0	113	4.71	97	4.04	0	0	113	4.71	97	4.04
3 Coho	8/10-8/11	24	1	0	1	75	3.13	0	0	0	1	188	3.92	97	2.02
4 Coho	814-8/15	24	2	0	0	181	3.77	25	0.52	0	1	369	3.84	122	1.27
5 Coho	8/17-8/18	24	0	No deliveries											
6 Coho	8/21-8/22	24	0	No deliveries											

No pink salmon were sold.
Total Hours fished = 144
Total number of permits used = 2

Table 6. Commercial salmon set gillnet catches from Golovin, Subdistrict 2, Norton Sound, 1995.

Period Number	Period Dates	Hours Fished	No. of Fishermen	Period Catch and Catch Per Unit Effort								Cumulative Catch and Catch Per Unit Effort							
				Chinook	Sockeye	Coho	CPUE	Chum	CPUE	Pink	CPUE	Chinook	Sockeye	Coho	CPUE	Chum	CPUE	Pink	CPUE
1Pink	7/17-7/18	24	4	0	0	0	0.00	294	3.06	1463	15.24			0		294		1463	15.24
2 Pink	7/19-7/20	24	5	0	0	4	0.03	290	2.42	1243	10.36			4		584		2706	12.53
3 Pink	7/21-7/22	24	5	0	0	3	0.03	570	4.75	1590	13.25			7		1154		4296	12.79
4 Coho	7/31-8/01	24	6	0	0	204	1.42	271	1.88	0	0.00			211	1.47	1425	9.90		
5 Coho	8/02-8/03	24	7	0	0	266	1.58	236	1.40	0	0.00			477	1.53	1661	5.32		
6 Coho	8/04-8/05	24	4	0	0	290	3.02	192	2.00	0	0.00			767	1.88	1853	4.54		
7 Coho	8/07-8/08	24	5	0	0	267	2.23	94	0.78	0	0.00			1034	1.96	1947	3.69		
8 Coho	8/09-8/10	24	3	0	0	183	2.54	6	0.08	0	0.00			1217	2.03	1953	3.26		
9 Coho	8/11-8/12	24	2	0	0	348	7.25	28	0.58	0	0.00			1565	2.42	1981	3.06		
10 Coho	8/14-8/16	48	1	0	0	51	1.06	6	0.13	0	0.00			1616	2.32	1987	2.85		
11 Coho	8/17-8/19	48	No deliveries											1616	2.32	1987	2.85		
12 Coho	8/21-8/23	48	No deliveries											1616	2.32	1987	2.85		
13 Coho	8/24-8/26	48	No deliveries											1616	2.32	1987	2.85		

Total Hours fished = 408
Total number of permits used = 7

Table 7. Commercial salmon set gillnet catches from Moses Point, Subdistrict 3, Norton Sound, 1995.

Period Number	Period Dates	Hours Fished	No. of Fishermen	Period Catch and Catch Per Unit Effort								Cumulative Catch and Catch Per Unit Effort							
				Chinook	Sockeye	Coho	CPUE	Chum	CPUE	Pink	CPUE	Chinook	Sockeye	Coho	CPUE	Chum	CPUE	Pink	CPUE
1Pink	7/17-7/18	24	5	0	0	1	0.01	59	0.49	941	7.84	0	0	1		59		941	7.84
2 Pink	7/19-7/20	24	6	0	0	1	0.01	215	1.49	1443	10.02	0	0	2		274		2384	9.03
3 Pink	7/21-7/22	24	4	0	0	3	0.03	226	2.35	578	6.02	0	0	5		500		2962	8.23
4 Coho	7/31-8/01	24	5	1	0	153	1.28	87	0.73	0	0.00	1	0	158	0.33	587	1.22		
5 Coho	8/02-8/03	24	4	0	0	91	0.95	41	0.43	0	0.00	1	0	249	0.43	628	1.09		
6 Coho	8/04-8/05	24	5	0	0	183	1.53	86	0.72	0	0.00	1	0	432	0.62	714	1.03		
7 Coho	8/07-8/08	24	5	0	0	465	3.88	106	0.88	0	0.00	1	0	897	1.10	820	1.00		
8 Coho	8/09-8/10	24	5	0	0	340	2.83	15	0.13	0	0.00	1	0	1237	1.32	835	0.89		
9 Coho	8/11-8/12	24	4	0	0	314	3.27	57	0.59	0	0.00	1	0	1551	1.50	892	0.86		
10 Coho	8/14-8/16	48	10	0	0	866	1.8	173	0.36	0	0.00	1	0	2417	1.60	1065	0.70		
11 Coho	8/17-8/19	48	5	2	11	544	2.27	22	0.09	0	0.00	3	11	2961	1.69	1087	0.62		
12 Coho	8/21-8/23	48	6	1	11	595	2.07	32	0.11	0	0.00	4	22	3556	1.74	1119	0.55		
13 Coho	8/24-8/26	48	7	0	22	186	0.55	52	0.15	0	0.00	4	44	3742	1.57	1171	0.49		

Total Hours fished = 408
Total number of permits used = 12

Table 8. Commercial salmon set gillnet catches from Shaktoolik, Subdistrict 5, Norton Sound, 1995.

Period Number	Period Dates	Hours Fished	No. of Fishermen	Period Catch and Catch Per Unit Effort								Cumulative Catch and Catch Per Unit Effort							
				Chinook	CPUE	Sockeye	Coho	CPUE	Chum	CPUE	Pink	CPUE	Chinook	CPUE	Sockeye	Coho	CPUE	Chum	CPUE	Pink	CPUE
1 King	6/12-6/13	24	7	98	0.58	0	0	0.00	11	0.07	0	0.00	98	0.58	0	0		11		0	
2 King	6/15-6/16	24	10	91	0.38	0	0	0.00	5	0.02	0	0.00	189	0.46	0	0		16		0	
3 King	6/19-6/21	48	12	344	0.60	0	0	0.00	73	0.13	0	0.00	533	0.54	0	0		89		0	
4 King	6/22-6/24	48	11	206	0.39	0	0	0.00	167	0.32	0	0.00	739	0.49	0	0		256		0	
5 King	6/26-6/28	48	12	347	0.60	0	0	0.00	418	0.73	5	0.01	1,086	0.52	0	0		674		5	
6 Chum	6/29-7/1	48	8	70	0.18	0	0	0.00	39	0.10	0	0.00	1,156		0	0		713	0.10	5	
7 Chum	7/3-7/5	48	8	47	0.12	0	0	0.00	3,426	8.92	120	0.31	1,203		0	0		4,139	4.51	125	
8 Chum	7/6-7/8	48	13	27	0.04	2	0	0.00	2,487	3.99	945	1.51	1,230		2	0		6,626	4.30	1,070	
9 Pink	7/10-7/11	24	13	6	0.02	2	0	0.00	278	0.89	8995	28.83	1,237		4	0		7,650		10,065	28.83
10 Pink	7/12-7/13	24	16	1	0.00	0	0	0.00	746	1.94	16,082	41.88	1,237		4	0		8,367		26,147	36.03
11 Pink	7/14-7/15	36	15	0	0.00	0	0	0.00	717	1.33	11,230	20.80	1,237		4	0		8,367		37,377	29.38
12 Coho	7/24-7/26	48	16	1	0.00	1	319	0.42	2,448	3.19	0	0.00	1,238		5	319	0.42	10,815	3.19	37,377	
13 Coho	7/31-8/2	48	20	1	0.00	0	1441	1.50	1,746	1.82	0	0.00	1,239		5	1,760	1.02	12,561	2.43	37,377	
14 Coho	8/3-8/2	48	6	0	0.00	0	211	0.73	216	0.75	0	0.00	1,239		5	1,971	0.98	12,777	2.19	37,377	
15 Coho	8/7-8/9	48	16	0	0.00	0	1817	2.37	577	0.75	0	0.00	1,239		5	3,788	1.36	13,354	1.79	37,377	
16 Coho	8/10-8/12	48	15	0	0.00	0	2366	3.29	509	0.71	0	0.00	1,239		5	6,154	1.76	13,863	1.57	37,377	
17 Coho	8/14-8/16	48	15	0	0.00	0	2,185	3.03	534	0.74	0	0.00	1,239		5	8,339	1.97	14,397	1.43	37,377	
18 Coho	8/17-8/19	48	8	0	0.00	0	815	2.12	164	0.43	0	0.00	1,239		5	9,154	1.99	14,561	1.34	37,377	
19 Coho	8/21-8/23	48	8	0	0.00	0	531	1.38	78	0.20	0	0.00	1,239		5	9,685	1.94	14,639	1.26	37,377	
20 Coho	8/24-8/26	48	12	0	0.00	0	1,170	2.03	136	0.24	0	0.00	1,239		5	10,855	1.95	14,775	1.15	37,377	

Total Hours fished = 852
Total number of permits used = 26

Table 9. Commercial salmon set gillnet catches from Unalakleet, Subdistrict 6, Norton Sound, 1995.

Period Number	Period Dates	Hours Fished	No. of Fishermen	Period Catch and Catch Per Unit Effort								Cumulative Catch and Catch Per Unit Effort							
				Chinook	CPUE	Sockeye	Coho	CPUE	Chum	CPUE	Pink	CPUE	Chinook	CPUE	Sockeye	Coho	CPUE	Chum	CPUE	Pink	CPUE
1 King	6/12-6/13	24	38	812	0.89	0	0	0.00	11	0.01	0	0.00	812	0.89	0	0		11		0	
2 King	6/15-6/16	24	33	477	0.60	0	0	0.00	22	0.03	0	0.00	1,289	0.76	0	0		33		0	
3 King	6/19-6/21	48	46	2,555	1.16	3	0	0.00	293	0.13	0	0.00	3,844	0.98	3	0		326		0	
4 King	6/22-6/24	48	32	1,838	1.20	0	0	0.00	496	0.32	0	0.00	5,682	1.04	3	0		822		0	
5 King	6/26-6/28	48	44	988	0.47	0	0	0.00	940	0.45	0	0.00	6,670	0.88	3	0		1,762		0	
6 Chum	6/29-7/1	48	28	405	0.30	0	0	0.00	1,197	0.89	0	0.00	7,075		3	0		2,959	0.89	0	
7 Chum	7/3-7/5	48	23	326	0.30	1	0	0.00	5,318	4.82	0	0.00	7,401		4	0		8,277	2.66	0	
8 Chum	7/6-7/8	48	28	125	0.09	5	0	0.00	4,697	3.49	500	0.37	7,526		9	0		12,974	2.96	500	
9 Pink	7/10-7/11	24	12	5	0.02	0	1	0.00	146	0.51	8307	28.84	7,558		9	9		13,530		8,807	28.84
10 Pink	7/12-7/13	24	14	27	0.08	0	8	0.02	410	1.22	11,459	34.10	7,572		10	22		14,014		20,266	31.64
11 Pink	7/14-7/15	36	16	14	0.02	1	13	0.02	484	0.84	15,718	27.29	7,572		10	22		14,014		35,984	29.57
12 Coho	7/24-7/26	48	24	5	0.00	1	907	0.79	3,894	3.38	1,025	0.89	7,577		11	929	0.81	17,908	3.38	37,009	
13 Coho	7/31-8/2	48	32	7	0.00	10	3002	1.95	2,667	1.74	0	0.00	7,584		21	3,931	1.46	20,575	2.44	37,009	
14 Coho	8/3-8/2	48	12	1	0.00	1	2016	3.50	761	1.32	0	0.00	7,585		22	5,947	1.82	21,336	2.24	37,009	
15 Coho	8/7-8/9	48	34	6	0.00	13	4640	2.84	961	0.59	0	0.00	7,591		35	10,587	2.16	22,297	1.69	37,009	
16 Coho	8/10-8/12	48	34	2	0.00	6	5624	3.45	784	0.48	0	0.00	7,593		41	16,211	2.48	23,081	1.39	37,009	
17 Coho	8/14-8/16	48	33	2	0.00	4	6,355	4.01	540	0.34	0	0.00	7,595		45	22,566	2.78	23,621	1.18	37,009	
18 Coho	8/17-8/19	48	24	8	0.01	0	2,618	2.27	401	0.35	0	0.00	7,603		45	25,184	2.72	24,022	1.08	37,009	
19 Coho	8/21-8/23	48	28	10	0.01	11	3,144	2.34	469	0.35	0	0.00	7,613		56	28,328	2.67	24,491	0.99	37,009	
20 Coho	8/24-8/26	48	27	4	0.00	22	2,952	2.28	352	0.27	0	0.00	7,617		78	31,280	2.63	24,843	0.91	37,009	

Total Hours fished = 852
Total number of permits used = 58

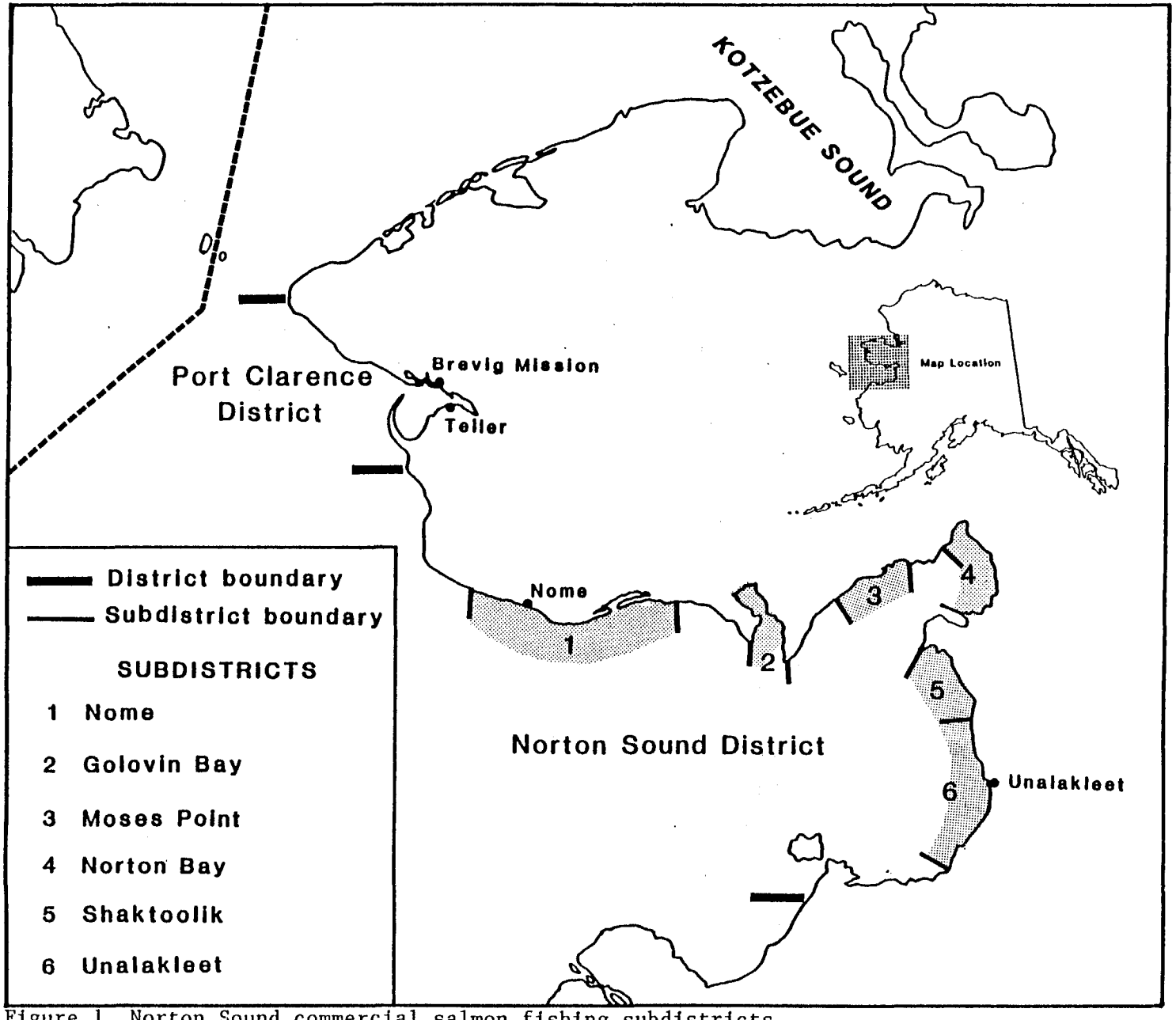

Figure 1. Norton Sound commercial salmon fishing subdistricts.

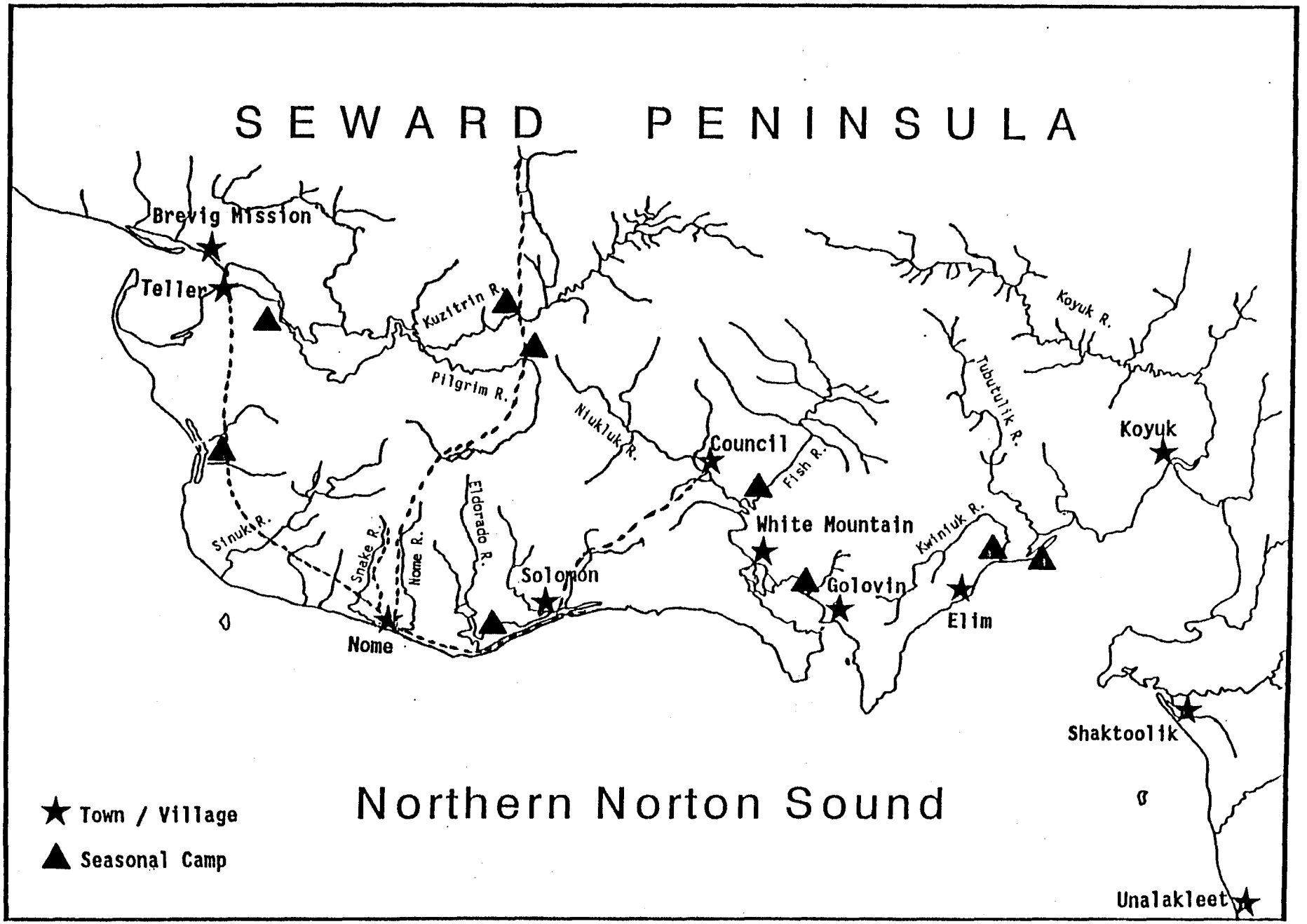

Figure 2. Northern Norton Sound subsistence fishing sites.